CHAPTER - I

NORTHERN MEGHALAYA - GEOGRAPHICAL SETTING

AN OVERVIEW

1.1 Geographical Location:

Meghalaya is one of the States in North East India, located south of Lower Assam (south of the districts - Karbi-Anglong, Nalbari, Kamrup, Barpeta and Goalpara of Assam). It was formerly a part of Assam which became an Autonomous State on April 2, 1970. But it did not retain that status for long. Under the North Eastern Areas (Reorganisation) Act, 1971, Garo Hills District, United Khasi and Jaintia Hills District were combined together and formed a State with Shillong as its capital. The State was formally inaugurated on January 21, 1972. On 22nd February 1972, the Jaintia Hills District was created with Jowai as its headquarter. In October, 1976, two new districts were created namely - the East Garo Hills District with its headquarter at Williamnagar and West Khasi Hills District with its headquarters at Nongstoin.\(^1\) Later two more

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districts namely the West Garo Hills District and the East Khasi Hills District were also created with Tura and Shillong as their respective headquarters.

The Shillong Plateau comprising the Garo, Khasi and Jaintia and the outlying Mikir Hills is the eastern most continuation of the massive block of the peninsular India. It was cut off from the 'table-land' by the interposing Ganges and Brahmaputra alluviation. Consequent upon remarkable tectonic upheavalment from the late Permian era.

It is sandwiched between the Brahmaputra Valley on the north and the Surma Valley on the south. On the west it is bounded by the districts of Goalpara of Assam and part of Rangpur District of Bangladesh. Regionally though not politically, Meghalaya continues eastwards beyond the administrative limit of the United Khasi-Jaintia Hills District enclosing the districts of Mikir Hills and North Cachar Hills including the lofty Barail ranges.

A typically plateau region although dissected into ridges and valleys at different levels and of varying ruggedness, Meghalaya falls into three distinct physiographic sections - the Garo Hills in the western part, the Khasi in the middle and the Jaintia Hills in the south-eastern part. Each of these sections differs from one another in respect of physical environment, human activities and social
development.  

Situated between $89^\circ 47'$ and $91^\circ 2'$ East longitude and $25^\circ 9'$ to $26^\circ$ North latitude, Western Meghalaya (Garo Hills) covers an area of 8,084 sq.km. extending about 90 km. east west and also for about the equal distance north-south. The Tura range and the Arbela range runs almost through the Garo Hills in the east-west alignment from Tura to Siju, a distance of 50 km and joins the Khasi Hills. The average elevation of the region is 600 m and the highest elevation is recorded at a peak named Nokrek (1431 m), 13 km south of Tura Town.

Further, west lies the Central Meghalaya (Khasi Hills) which extends as far as $92^\circ 5'$ east longitude, covers an area of 11,168.1 sq.km. It presents a true plateau character. At micro-level, one finds heaving hills in the north, upland topography in the central zone and steep rocky face of the upland in the south. Being a true representative, in respect of geology, physiography and morphology, this central part of Meghalaya has been selected for intensive study. The northern Khasi Hills has an area of 5,446.1 sq.km. It is also morphologically convenient to divide the plateau into a number of divisions on the basis of either the water-parting likes or the general drainage pattern. The northern Khasi Hills being

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adjacent to the lowlying areas of the Brahmaputra Valley exhibits conspicuous relief development under usual processes and mechanisms of landscape evolution. This is the primary consideration for selection of the area for the study (Map 1.1).

The northern undulating hills have coinciding summits (170-180 m), which slopes down gradually towards the Brahmaputra Valley further downwards. This submountainous tract is locally termed as 'Bhoi' country by the Khasi people.

The most cynosural part of the Central Meghalaya is however, the central upland zone. It forms the highest portion of the entire Meghalaya region ranging approximately between 1850 m and 1230 m comprising mainly the highlands of the Khasi and Jaintia Hills District. From Shillong Peak (1961 m) the highest point, it stretches in undulating form to a distance of about 50 kms towards south, 65 kms towards south-east, and finally merges itself with the southern border areas. Similarly towards the north, it stretches for a distance of about 20 kms, to merge itself with the northern border areas.  

South of the Central upland zone is a belt of steep slopes locally known as the 'war' country. This area exhibits a typical granite topography and rounded hills and

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Source: Based on Survey of India with the permission of the Surveyor General

Map - 11 -
shallow valleys of the Mylliem granite, south of Mylliem, is
the vast structural platform on which stands Cherrapunji.
From Cherrapunji, the terrain has a gentle slope southwards
for about 7 km and then falls abruptly to the Sylhet Plain.

To the east of the Central Meghalaya lies the
eastern Meghalaya (Jaintia Hills) limited by 92°50' east
longitude. It comprises of the detached portion of the
Mikir Hills, covering an area of 3924 sq.km, and is there­
fore, the smallest unit of Meghalaya. Within its small
administrative unit it rises to a maximum height of 1350 m
near Jowai which acts as a watershed for the northern and
southern group of tributaries.

1.2 Geology of the Region:

Regarding the geological formations of the hills,
the Shillong Plateau possess a complex geological exposure
right from pre-cambrian to tertiary period.

It is essentially constituted of the rocks of the
pre-cambrian age over which the pre-tertiary and the
tertiary rocks occur unmalleably on the western and the
southern margin of the plateau (detail in chapter 2).

On the north-west, the Shillong Plateau is primarily
dominated by the gneissic group of rocks. In the northern
part, these rocks are exposed in low hills, very irregular in
outline, with numerous outliers in the Brahmaputra Valley, even extending close to the Himalayas beyond the Brahmaputra Valley. In the central region the gneiss is covered by a sub-metamorphic rocks, consisting of a strong band of quartzites overlying the schists.

At the very centre of the plateau, where the 'table-land' attains its highest elevation, great masses of intrusive diorite and granite occur and the latter is found in dykes piercing the gneiss and sub-metamorphic series through the southern half of the boundary of the plains. In this part, varieties of sub-metamorphosed or metamorphosed rocks overlie the cambrian and pre-cambrian basic rocks including the Sylhet Trap rocks.

1.3 Drainage System of Northern Meghaleya:

The drainage pattern in the region represents a very spectacular feature of relief development. The rivers flowing apparently along joints and faults have given rise to a radial drainage pattern. It has also been observed that the fault planes, fold axis and the dominant NW-SE joints control the drainage system in the region.

The central upland ridge which traverses through the centre of the Khasi Hills district forms a distinct watershed between the north and south Khasi Hills from which the

hill streams flow down to the Surma Valley in the south and the Brahmaputra in the north respectively. (Map No. 1.2). The northern part of the plateau in absence of any sedimentary rock cover, is marked by long, incisive valleys formed due to headward erosion along joints in the gneissic and granite rocks.5

The principal rivers of the northern Khasi Hills like Umkhri (Kulsi), Urtru (Digaru), Umiam (Killing) and Umkher (Barapani) flow towards the Brahmaputra in the north (detailed in chapter 5).

These northern rivers while entering into the plain tract produces plain embayments thereby making the northern face of the plateau irregularly rugged. The north flowing rivers are also equally responsible for minimising the gradient of slopes considerably.

1.4 Climate of the Region:

The region as a whole experiences a tropical monsoon climate. In summer the temperature rises to round about 20°C and the mean winter temperature is about 9°C with periodic deviations to below the freezing point (December, January), marked by the appearance of ground frost at night and morning over the areas of higher elevations.

The thermal conditions of the Central Meghalaya (Khasi Hills) is moderate and the climate is consequently conducive compared to other areas of higher elevations. At the foot hills of the southern slopes and sub-montane regions in the north and east, the climate is slightly humid and warm (chapter 2).

There is also a great variation of rainfall within the region from south to north. The southern Meghalaya directly encounters the incoming monsoon winds during summer. The southern slopes has complex structural irregularities for which the monsoon winds are subjected to variable adiabatic upliftment and changes which causes wide differences in the amount of rainfall. The east-west ranges of Central Meghalaya, acts as a barrier to the incoming monsoon for which the northern part of the Meghalaya falls under a partial rain-shadow zone. The relief of Meghalaya is solely responsible for variable distribution of rainfall in different parts of the State. For this, Shillong receives less amount of rainfall than Cherrapunji. Further, north, rainfall gradually decreases and as such the northern slopes of the Khasi Hills experiences moderate rainfall.

1.5 Soil and Vegetation:

The soil in the region varies from light to heavy texture, they are mostly acidic in nature and are comparatively
rich in organic matter and nitrogen but poor in phosphate content.

The sub-montane region consists of red-soil with moderate content of potash. Both the soil and climate of the plateau offers favourable opportunities for the development of horticulture.

However, the hilly tract has a very slow process of soil formation and at the same time the area is subjected to soil wash during rainy season. The cross profile of the soil shows that the entire Meghalaya except the narrow valleys contain very shallow soil structure.

On account of heavy rainfall and well-drained terrain, Meghalaya is endowed with plushy natural vegetation ranging from sub-temperate to tropical forest. Moreover, the greater part of Western Meghalaya that is Garo Hills is clothed with thick tropical forest where the hills are mainly covered with mixed evergreen sal forests and bamboos.

Central Meghalaya or the Khasi Hills on the other hand has a diverse type of natural vegetation. At a height of 1000 m, tropical vegetation is predominantly visible. The western and northern borders of the Khasi Hills are well-clad with tropical grasses. A wide portion of the Central upland zone of the Khasi Hills District has a meadow type of grass lands. The Alpine vegetation is seen at higher elevations.
beyond 1300 m altitudes. Temperate forests are seen northwards up to an altitude of 800 m. The lower reaches of northern hills facing the Brahmaputra Valley are clothed with tropical deciduous vegetation with varieties of species. The natural vegetation of Eastern Meghalaya resembles more that of Central Meghalaya except that here tropical trees and grasses are more common.

1.6 Population and Settlement Pattern:

Meghalaya witnessed a rapid growth of population in the period of 1901-81 (Table 1.1). In 1901 the population of Meghalaya was 3,40,524 persons and this increased to 13,35,819 persons in 1981 (Census), thereby showing an increase of 292.28 per cent, which means a growth rate of 3.65 per cent per annum. No doubt, the growth rate has never been uniform, for whereas in between 1911-21, the growth rate was 7.21 per cent it was 8.97 per cent in the 1941-51 period (Fig. 1.1). The increase was 31.50 per cent in the decade 1961-71, and in 1971-81 it was 32.04 per cent which is the highest decadal growth rate so far. (Table 1.2). The reason for this is not far to seek. In the period 1911-21 the high incidence of malaria, kalazar and other diseases took a heavy toll of human life and this acted to increase the death rate. Similarly, between 1941-51 the growth rate was low. This was inevitable because Jaintiapur area (a densely populated tract of erstwhile United Khasi and Jaintia Hills) was transferred to East Pakistan (now Bangladesh). However, after 1961 with the
GRAPH SHOWING DECADAL PERCENTAGE VARIATION OF POPULATION IN KHASI HILLS, MEGHALAYA AND INDIA (1901–1981)

INDEX

- Khasi hills.
- Meghalaya.
- India.

Fig - I.1.
Table 1.1


<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Sex Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901</td>
<td>1,67,256</td>
<td>1,73,268</td>
<td>3,40,524</td>
<td>1036</td>
</tr>
<tr>
<td>1911</td>
<td>1,95,706</td>
<td>1,98,299</td>
<td>3,94,005</td>
<td>1013</td>
</tr>
<tr>
<td>1921</td>
<td>2,11,216</td>
<td>2,11,187</td>
<td>4,22,403</td>
<td>1000</td>
</tr>
<tr>
<td>1931</td>
<td>2,43,993</td>
<td>2,36,844</td>
<td>4,80,837</td>
<td>971</td>
</tr>
<tr>
<td>1941</td>
<td>2,82,666</td>
<td>2,73,154</td>
<td>5,55,820</td>
<td>966</td>
</tr>
<tr>
<td>1951</td>
<td>3,10,706</td>
<td>2,94,968</td>
<td>6,05,674</td>
<td>949</td>
</tr>
<tr>
<td>1961</td>
<td>3,97,288</td>
<td>3,72,092</td>
<td>7,69,380</td>
<td>937</td>
</tr>
<tr>
<td>1971</td>
<td>5,20,969</td>
<td>4,90,732</td>
<td>10,11,699</td>
<td>942</td>
</tr>
<tr>
<td>1981 (Final)</td>
<td>6,79,519</td>
<td>6,48,824</td>
<td>13,35,319</td>
<td>955</td>
</tr>
</tbody>
</table>

Source: Govt. of Meghalaya, Statistical Handbook, 1982.

Improvement of medical, transport and communication facilities, development of mining areas and the establishment of defence installations and the central government establishments, the growth rate was accelerated. This was substantiated by the
Table 1.2

Percentage Variation in Population of Khasi Hills District
Meghalaya and India (1901-1981)

<table>
<thead>
<tr>
<th>Census</th>
<th>East Khasi Hill/West Khasi Hill</th>
<th>Meghalaya</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>1901 - 1911</td>
<td>16.23</td>
<td>15.70</td>
<td>5.75</td>
</tr>
<tr>
<td>1911 - 1921</td>
<td>3.49</td>
<td>7.21</td>
<td>-0.31</td>
</tr>
<tr>
<td>1921 - 1931</td>
<td>19.18</td>
<td>13.83</td>
<td>11.00</td>
</tr>
<tr>
<td>1931 - 1941</td>
<td>14.60</td>
<td>15.59</td>
<td>14.22</td>
</tr>
<tr>
<td>1941 - 1951</td>
<td>9.44</td>
<td>8.97</td>
<td>13.31</td>
</tr>
<tr>
<td>1951 - 1961</td>
<td>27.10</td>
<td>27.03</td>
<td>21.51</td>
</tr>
<tr>
<td>1961 - 1971</td>
<td>31.03 / 23.87</td>
<td>31.50</td>
<td>24.80</td>
</tr>
<tr>
<td>1971 - 1981</td>
<td>34.35 / 45.73</td>
<td>32.04</td>
<td>24.75</td>
</tr>
</tbody>
</table>

(Final)


Unabated influx of people from other States of India, and also from neighbouring countries like Nepal and Bangladesh.

The State has a population density of 60 persons per sq. km (1981 census) which is comparatively low, as compared to 220 persons per sq. km at the national level. The population is
unevenly distributed as is evident from the districtwise
density figures, for example, the density (persons per sq. 
km) is 98 in East Khasi Hills, 66 in West Garo Hills, 52 
in East Garo Hills, 41 in Jaintia Hills and 31 in West 
Khasi Hills. Highest concentration of population is 
found in the few limited urban centres of Meghalaya, 
namely, Shillong, Jowai, and Tura. Being the headquarter, 
these urban centres show very high density of settlements. 
Shillong has a total population of 1,74,703, Jowai, 12,923, 

The concentration of population also shows some 
special variations. Though the overall density per sq.km. 
is only 60 persons (1981 census), the actual densities in 
the urban and rural areas are highly disparate. The density 
of population in the rural areas is as low as 49 per sq.km. 
whereas, in urban areas it is as high as 3,227 per sq. km.

With the development of the State in various 
spheres, there is a gradual change in its settlement 
pattern and also in urbanisation.

Generally speaking, the region has a dispersed and 
scattered type of settlement pattern, obviously due to 
dissected and rugged terrain, the thin soil cover, limited

+ Source: Statistical Handbook of Meghalaya, 1982, 
Directorate of Economics, Statistics and 
fertile lands and less effectiveness of precipitation.  

Unlike the plains, the rural settlement in Meghalaya are confined to the gentle slopes and intermontane valleys where there is an easy source of drinking water and suitable agricultural land.

In the remote areas, the settlement is sedentary because the people depend upon 'jhum' cultivation. According to the convenient cycle of 'jhum', the people move from one area to another in search of 'jhum' land. But as one approaches the urban areas, permanent settlements are observed. In the recent years with the development of roads and other communication lines rapid linear settlements have developed throughout Meghalaya. The social structure of the indigenous people of Khasi Hill, Jaintia Hill and Garo Hills are not similar. The Khasi people are matriarchal whereas the rest are not. However, the male and female population ratio in the three regions are as follows. The sex ratio in Khasi Hills, Garo Hills and Jaintia Hills are 1,897, 1,903, 982 per thousand males respectively (1981 census); So far age structure is concerned 42.43 per cent belong below 15 years age group, 53.14 per cent 15-59 years and the rest are 60 and above years of age. Literacy rate varies 75.70 per cent in Khasi, 24.51 per cent in Jaintia and 59.42 per cent in Garo Hills respectively.

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1.7 Accessibility and Communication:

Being a hilly region, the development of transport and communication seems to be very slow and under-developed. At present, the road transport system is the life-line of Meghalaya. Before Independence, the length of the motorable roads in Meghalaya was insignificant. It was during the fourth five year plan that top priority was given to the all-round development of road in the State.

The State had a total road length of 4,117 km up to March, 1979. Of this about 1,487 km. were surfaced roads and 2,630 km. unsurfaced. The percentage of surfaced roads to total road length being about 36 per cent. The road density per 100 sq.km. of area comes to about 18.3 km. and is about 3.60 km per thousand population compared to all India figures of 48.9 km. and 2.5 km. respectively. The state has only 334 km. of national highways.

The villages are therefore inter-linked by means of weather roads. Besides, important trade centres are now connected by the national highways. Border towns have also been linked with the district headquarters by means of motorable roads (Map 1.3).

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8 The National Highway (NH) No. 40 connects Jorabat - Shillong - Tamabil and has a total length of 164 km. The NH 44 has a stretch of 174 km. and connects Shillong with Jowai and runs up to Agartala via Badarpur (in Assam).
Except roadways, development of other types of communication has limited scope. On account of this, more emphasis has therefore been given by Meghalaya Government for the development of roads. However, Meghalaya has very poor transport and communication system.

1.8 **Personal Observations in Relation to the Objective of the Study:**

The study of geomorphology is keenly associated with the future planning and development. Unless a comprehensive morphometric analysis is done, the true character and morphological configuration cannot be clearly explained.

An indepth morphometric analysis of a vast area like Shillong Plateau needs a longer period and innumerable phases of study for obtaining a comprehensive physio-analytical idea of the region.

Therefore, a micro-level study of northern and central Khasi Hills has been done within a limited period of time and the primary aim of such a study is to evaluate its morphogenetic history.

The reason behind selection of this northern and Central Khasi Hills as the area of study are firstly due to its easy accessibility.

Secondly, the Central Khasi Hills is a region of physical inequalities. It present a rich panorama of topo-
physical features characterized by scarp zones, erosional surfaces and residual hills etc. and has almost all the characteristics that are observed in other parts of Khasi Hills.

Thirdly, most of the rivers take their origin in this part and an adjustment of the drainage system to the geological structure has been prominently observed here.

For these reasons, it is considered that the area may be taken as a representative unit and the results of the study can perhaps be therefore generalized for the entire region.

A simple geomorphological study on the other hand bears no meaning until and unless it has a practical utility for the purpose and well-being of human society. In fact, the morphometric study that has been made, may be fruitfully utilized for constructive correlation between the human habitat and ecology for future planning and development of the region.